

**DETAILED ACTION**

***Response to Amendment***

1. The Amendment filed July 1, 2008 has been entered and fully considered.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over SEYANAGI et al. (US 2002/0183409) and in further view of THORNSBERRY (4,751,251).

Regarding Claim 1, SEYANAGI et al. discloses a process for producing a polyurethane foam that has fine cells (a method of fabricating a polyurethane foam with micro pores) (Page 1, [0003]) comprising the steps of:

(a) adding a nonionic surfactant into at least one of a first ingredient including an isocyanate group-containing compound and a second ingredient including an active hydrogen group-containing compound (Page 1, [0012]);

(b) agitating and mixing the mixture of the first ingredient and the second ingredient while adding a non-reactive gas thereto (Page 1, [0012]);

(c) discharging the mixture of step (b) out of a container (Page 4, [0058]);

(d) injecting the discharged mixture of step (c) into a mold so as to form into a predetermined shape (Page 2, [0023]; Page 5, [0062]).

SEYANAGI et al. is silent the said nonionic surfactant containing a hydroxyl group. However, THORNSBERRY discloses a surfactant composition used for producing rigidity in polyurethane foams (Col.1, lines 6-10) wherein the surfactant contains a hydroxyl group (Col.1, lines 13-32). SEYANAGI et al. discloses a need for a higher hardness (rigidity) for polyurethane foams by adding surfactant into the said materials for producing polyurethane (Page 1, [0011]). As disclosed in THORNSBERRY, the motivation for the combination would have been to produce the rigidity of polyurethane foams (Col.1, lines 13-32). Therefore, it would have been obvious to one of ordinary skill in the art to have modified the surfactant of SEYANAGI et al. to include hydroxyl group as disclosed by THORNSBERRY in order to produce a more rigid polyurethane foam.

Regarding Claim 2, SEYANAGI et al. discloses that the mixture obtained was agitated by a foaming mixer (the steps (b) and (c) are carried out simultaneously) (Page 5, [0062]).

Regarding Claims 3-4, SEYANAGI et al. discloses that the said first ingredient and the said second ingredient are agitated and mixed while adding a non-reactive gas thereto (Page 1, [0012]) but is silent to the injection rate of the said non-reactive gas to the mixture. However, SEYANAGI et al. discloses that the non-reactive gas may be positively sent into the mixture and only automatically involved into the mixture through agitation and that the diameter of cells (micro pores) may be controlled by adjusting the

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agitation conditions (Page 2, [0015]). Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed invention so that the agitation conditions may be changed or adjusted by the injection rate of the non-reactive gas in order to form specific diameter for the micro pores.

Regarding Claims 5-6, SEYANAGI et al. discloses discharging the mixture out of a container (Page 4, [0058]) but is silent to the rate at which the mixture discharges out of said container. However, the discharge rate depends on the viscosity and density of the mixture as well as the agitation conditions it was exposed to. Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed invention based on the properties of the mixture.

Regarding Claims 7-8, SEYANAGI et al. discloses agitating and mixing the mixture of the first ingredient and the second ingredient while adding a non-reactive gas thereto (Page 1, [0012]) but is silent to the pressure in which this step is carried under. However, the non-reactive gas would have to be compressed, in other words carried out under pressure, in order to be forced into the mixture. Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed invention.

Regarding Claims 9-10, SEYANAGI et al. discloses that the amount of the said surfactant to be added is preferably 0.1 to 5 wt% to total amount of first and second ingredients (Page 1, [0014]).

Regarding Claim 11, SEYANAGI et al. discloses in Example 6 that the content of the active hydrogen group-containing compound in the mixture used was 16.28 parts by

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weight with respect to 100 parts of weight of the first and second ingredients (Page 5, [0065]).

Regarding Claim 12, SEYANAGI et al. discloses that the isocyanate group-containing compound is an isocyanate terminated urethane prepolymer (Page 5, [0062]).

Regarding Claim 13, SEYANAGI et al. discloses that the surfactant is a nonionic silicone-based surfactant containing no hydroxyl group (Page 1, [0012]).

Regarding Claim 14, SEYANAGI et al. discloses that the mixture comprises an organic hollow sphere (Page 1, [0005] and [0007]).

Regarding Claims 15 and 16, SEYANAGI et al. discloses a process for producing a polyurethane foam that has fine cells (a method of fabricating a polyurethane foam with micro pores) (Page 1, [0003]) comprising the steps of:

(a) adding a nonionic surfactant where the amount of the said surfactant to be added is preferably 0.1 to 5 wt% to total amount of first and second ingredients (Page 1, [0014]) into at least one of a first ingredient including an isocyanate group-containing compound and a second ingredient including an active hydrogen group-containing compound (Page 1, [0012]);

(b) agitating and mixing the mixture of the first ingredient and the second ingredient while adding a non-reactive gas thereto (Page 1, [0012]);

(c) discharging the mixture out of a container (Page 4, [0058]);

(d) injecting the discharged mixture into a mold so as to form into a predetermined shape (Page 2, [0023]; Page 5, [0062]).

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SEYANAGI et al. is silent the said nonionic surfactant containing a hydroxyl group. However, THORNSBERRY discloses a surfactant composition used for producing rigidity in polyurethane foams (Col.1, lines 6-10) wherein the surfactant contains a hydroxyl group (Col.1, lines 13-32). SEYANAGI et al. discloses a need for a higher hardness (rigidity) for polyurethane foams by adding surfactant into the said materials for producing polyurethane (Page 1, [0011]). As disclosed in THORNSBERRY, the motivation for the combination would have been to produce the rigidity of polyurethane foams (Col.1, lines 13-32). Therefore, it would have been obvious to one of ordinary skill in the art to have modified the surfactant of SEYANAGI et al. to include hydroxyl group as disclosed by THORNSBERRY in order to produce a more rigid polyurethane foam.

SEYANAGI et al. is silent to the pressure in which this step is carried under. However, the non-reactive gas would have to be compressed, in other words carried out under pressure, in order to be forced into the mixture. Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed invention.

SEYANAGI et al. is silent to the rate at which the mixture discharges out of said container. However, the discharge rate depends on the viscosity and density of the mixture as well as the agitation conditions it was exposed to. Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed invention based on the properties of the mixture.

SEYANAGI et al. is silent to the injection rate of the said non-reactive gas to the mixture. However, SEYANAGI et al. discloses that the non-reactive gas may be

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positively sent into the mixture and only automatically involved into the mixture through agitation and that the diameter of cells (micro pores) may be controlled by adjusting the agitation conditions (Page 2, [0015]). Therefore, it would have been obvious to one of ordinary skill in the art to arrive at the claimed invention so that the agitation conditions may be changed or adjusted by the injection rate of the non-reactive gas in order to form specific diameter for the micro pores.

Regarding Claim 17, SEYANAGI et al. discloses that the surfactant is a nonionic silicone-based surfactant containing no hydroxyl group (Page 1, [0012]).

Regarding Claim 18, SEYANAGI et al. discloses that the polyurethane foam obtained by the said method of fabricating polyurethane foam with micro pores is used as a polishing pad (Page 1, [0001]).

Regarding Claim 19, SEYANAGI et al. discloses that the density of the foam obtained is preferably approximately  $0.6$  to  $0.95 \text{ g/cm}^3$  and hardness of shore D is preferably 50 to 56 (polishing pad has a density of  $0.5$  to  $1.0 \text{ g/cm}^3$  and hardness of shore D of 50 to 70) (Page 2, [0015]).

Regarding Claims 20-21, SEYANAGI et al. discloses that the polyurethane foam obtained by the said method of fabricating polyurethane foam with micro pores is used as a polishing pad (Page 1, [0001]).

4. Claims 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over SEYANAGI et al. (US 2002/0183409) and THORNSBERRY (4,751,251) as applied to claims 1-21 above, and in view of PRASAD (US 2003/0220061).

The teachings of SEYANAGI et al. and PRASAD are applied as described above for claims 1-21.

Regarding Claims 22 and 25, SEYANAGI et al. discloses a process for producing a polyurethane foam that has fine cells (a method of fabricating a polyurethane foam with micro pores) (Page 1, [0003]) comprising the steps of:

(a) adding a nonionic silicone-based surfactant into at least one of a first ingredient including an isocyanate terminated urethane prepolymer (Page 5, [0062]) and a second ingredient including an active hydrogen group-containing compound (Page 1, [0012]);

(b) agitating and mixing the mixture of the first ingredient and the second ingredient while adding a non-reactive gas thereto (Page 1, [0012]).

SEYANAGI et al. discloses that the polyurethane foam obtained by the said method is used as a polishing pad (Page 1, [0001]).

SEYANAGI et al. is silent to the volume of the micro pores. However, PRASAD discloses a microporous polishing pad wherein the porous foam has a volume of about 25% or less (Page 3, [0033]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of producing the polishing pad of SEYANAGI et al. to include the micro porous volume of PRASAD in order to produce a polishing pad comprising porous foam having a uniform pore size distribution (Page 1, [0002]).

Regarding Claims 23-24, SEYANAGI et al. discloses that the fine cells (micro pores) of the polishing pad preferably has an average diameter of 10 to 50  $\mu\text{m}$  (Page 2, [0015]).

### ***Response to Arguments***

5. Applicant's arguments, see 7-12 of the Remarks, filed July 1, 2008, with respect to the rejection(s) of claim(s) 1, 2, 12, 14, and 18 under 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of SEYANAGI et al. under 103(a).

Applicant's arguments with respect to claims 1, 13, 15, and 17 have been considered but are moot in view of the new ground(s) of rejection.

#### Applicant argues on pages 9-12 of the Remarks:

a) Applicant's claim that the micro pores are generated by the non-reactive gas within the combined mixture of the first ingredient with the second ingredient and surfactant, to distinguish this step from SEYANAGI et al., where the micro pores are generated in the mixture of the surfactant and the first ingredient only.

b) Method taught in Prasad cannot be combined with the method taught in SEYANAGI et al.

Examiner respectfully disagrees with the Applicant's above arguments and would like to point out the reason(s) as discussed in the rejection:

a) SEYANAGI et al. discloses agitating and mixing the mixture of the first ingredient and the second ingredient while adding a non-reactive gas thereto (Page 1, [0012]).

b) In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of producing the polishing pad of SEYANAGI et al. to include the micro porous volume of PRASAD in order to produce a polishing pad comprising porous foam having a uniform pore size distribution (Page 1, [0002]). One of ordinary skill in the art would know that the state of gas used, whether it is in a supercritical state or not, would not change the pore volume. The state of gas is independent of pore volume. Pore volume is dependent on gas not state of gas.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stella Yi whose telephone number is 571-270-5123. The examiner can normally be reached on Monday - Thursday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Christina Johnson/

Supervisory Patent Examiner, Art Unit 1791